X-RAYS OF SURGERY

NOTES OF MEDADTEAM

- Notes from lessons of Dr Ali Hasseb

MEDADTEAM

2010

1.25 L.E.

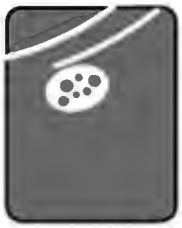
Biliary System

1- Oral cholecystography

شعارها فى السيستم: جوافاية فى الـ RT hypochondrium

You can find filling defects = chronic calcular cholecystitis (Gall stones).

Normal View



Filling Defects of Gall Stones

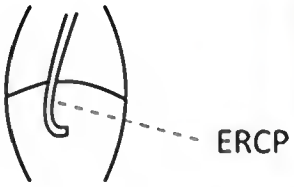
Oral Cholecystography

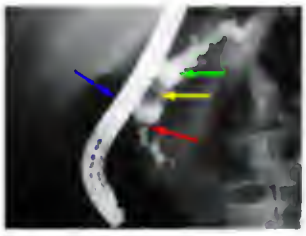
2- ERCP (Endoscopic Retrograde CholangioPancreatography)

هتلاقى الـ ERCP عبارة عن خرطوم كبير داخل من فوق و واصل لغاية الـ Duodenal papilla

You should comment on the following:

a) **CBD: dilated or not?**
   Normal diameter:
   By US: 7mm
   By X-Ray: 10mm (as radiology produces magnification and also the injected dye dilates the duct)
b) **Filling defects**: If present then it is calcular obstructive jaundice
c) **Pancreatic duct:** visible or not
d) **Stricture** or not





Endoscopic Retrograde CholangioPancreatography

3- T-Tube cholangiography

بتعرفها انك بتلاقى انبوبة رفيعة واصلة من نص الـ bile duct و طالعة فى الشارع برا

Comment on:

a) Filling defect = residual stone
b) Dilatation or not
c) Free flow of the dye to the duodenum
d) Gall bladder viewed or not و غالباً مش موجودة لانك شيلتها

T-tube

4- PTC (Percutaneous Transhepatic Cholangiography)

- هتلاقيها عبارة عن شجرة فى الـ Rt hypochondrium بس مش هتلاقى فيها خرطوم بتاع ERCP و مش هتلاقى فيها T-Tube لكن ممكن تشوف ابرة رفيعة جداً داخلة من برا الـ liver عشان يتحقن منها الـ dye ,, اسم الابرة دي Cheba Needle
- بس خد بالك برضو ممكن مش تشوف الابرة
- امشى مع الـ bile duct حتى تصل الى الـ obstruction
- Obstruction is due to either Stones or Stricture

N.B.	Any PTC=Obstructive jaundice CBD normally has smooth tapering lower end Any X-Ray with Dye don't comment on anything except dye Barium.

Barium

- **قانون 1**: احترم الاسهم فى الاشعة لأنها تشاور على الـ pathology
- **قانون 2** : No double pathology in your exam
- **قانون 3** : فى اى x-ray with dye ← لاتنشغل بنوع الـ view
- **قانون 4** : we see small intestine in two types of films ; barium enema & barium meals
- **قانون 5** : تبص من تحت لفوق ← in barium enema
  تبص من فوق لتحت ← in barium meal
- **قانون 6** : افرد الانبوبة فى دماغك
- **قانون 7** : الـ ulcerative colitis آخر حاجة تشخصها
  As loss of haustrations may be found normally

Esophagus

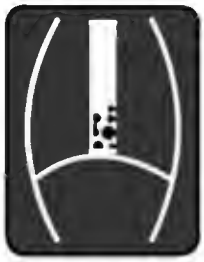
1) **Achalasia: (failure of relaxation)**
   Lower end of esophagus is dilated, smooth and there may be tapering end
   و لازم تبقى عند الـ diaphragm او تحته على طول

2) **Post corrosive:**
   Multiple and long strictures

3) **Varices:**
   Normal esophagus with rounded and longitudinal filling defects
   و لازم تلاقيها بدأت تحت الأول فى الـ lower third و ممكن تطلع لفوق
   لكن لو لقيت filling defects in middle third only دى ما تبقاش varices


Achalasia


Post Corrosive Stricture


Esophageal Varices

4) **Cancer Esophagus:**
   irregular filling defects عن عبارة سوداء حاجة جواه و باين wall الـ
   و ممكن كمان يبقى فيه shouldering

5) **Pharyngeal diverticulum:**
   Pouch filled with dye in the neck
   ممكن لو صورت العيان بسرعة تلحق تشوف كمان الـ esophagus لكن عادة مش بنشوفه لأن الـ barium بينزل على طول على الـ stomach

6) Esophageal atresia:

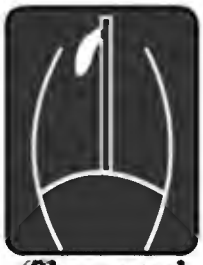
- دى بتبقى اشعة طفل
- الولد بيبقى الـ esophagus بتاعه مسدود و مفيش أكل بيوصل خالص للـ stomach
- و كمان مفيش هوا بيوصل للـ stomach بس ساعات بيبقى فيه fistula ما بين الـ lower segment of esophagus و الـ trachea و دى تدخل هوا جوا الـ stomach
- فلو لقيت هوا جوا الـ stomach يبقى دا عنده tracheo-esophageal fistula

X-Ray may be one of two forms:

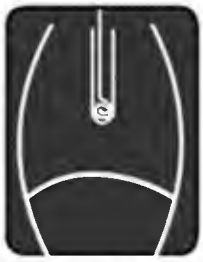
1st picture: you will find the Ryle tube coiled inside the esophagus and doesn't reach down

2nd picture: we use lipiodol dye (as aspiration of barium is dangerous in this patient) the dye will stop in middle of esophagus

Carcinoma



Pharyngeal Diverticulum

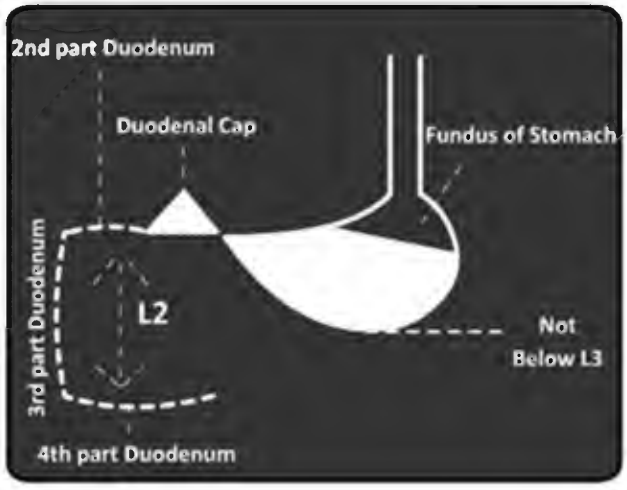


Esophageal Atresia

Barium Meal

Normal barium meal shows the following:

- Fills the body & antrum of stomach
- Normally the stomach dosen't descend below L3 vertebra, if it is lower than L3 then it is dilated stomach
- 1st part duodenum is full, triangular & smooth
- 2nd, 3rd & 4th part of duodenum form a concavity called C-Curve of duodenum
- Normally the C-Curve is not more than 1 vertebra (L2)
- If the C-Curve is wider than L2 vertebra so this is carcinoma head of pancreas



Scheme of reading Barium meal:

- 1st look at the lesser curvature to detect ulcer niche
- 2nd look at the greater curvature to detect carcinoma
- 3rd look at the duodenal cap to detect its deformity
- 4th look at the C-curve to detect carcinoma head of pancreas

N.B : To say that duodenal cap is deformed there must be serial views and cap should be deformed in them.
But sometimes you can say it is deformed in a single view if the arrow points to the cap.

1- Chronic duodenal ulcer:

Either persistent deformity in duodenal cap in serial films OR a single view and an arrow on the deformed cap

Chronic Gastric Ulcer

2- Chronic gastric ulcer:

Ulcer niche on the lesser curvature and ulcer notch on the greater curvature opposite to the niche

3- Gastric carcinoma:

Irregular filling defect & most common in antrum


Gastric Carcinoma

4- CHPS:

Stomach markedly dilated & obstructed

بالونة مليانة dye و مافيش صبغة واصلة الـ intestine

5- Pyloric obstruction:

Stomach passes in 2 stages:

1st stomach is hypertrophic and peristalsis

2nd stage the stomach fails & dilates

Only the 2nd stage is in curriculum you will find the stomach dilated (below L3) – Soap dish appearance

Then to differentiate whether it is benign or malignant look at the pylorus:

-Smooth: benign

-Irregular: Malignant


CHPS

6- Cancer head of pancreas:

Widened C-Curve > 1 vertebrae

7- Hiatus hernia:

Sliding hiatus hernia: Cardia is above the diaphragm

Para esophageal hernia: Cardia is normal in its place but the stomach herniates to the chest beside the esophagus

N.B:

- To diagnose hiatus hernia we do barium meal in Trendlenberg position
  يعنى هنشرب العيان barium و بعد كدا ينام و نرفع رجله عشان الوضع دا بيخلى الـ barium يرجع و نقدر نشوف أى reflux و كان الـ barium هايروح الـ fundus فنقدر نشوف لو فيه hiatus hernia or not
- When we make a barium meal for stomach we keep the diaphragm in top of x-ray, but if we want to diagnose hiatus hernia we must show the lower part of esophagus. So if the chest is not present in the x-ray , don't diagnose hiatus hernia
- مفيش اى اشعة تانية علينا فى المنهج تعمل كعبورة فوق الـ diaphragm غير الـ hiatus hernia

© How to differentiate between Barium swallow & Barium meal in Trendlenberg position (both of them contain barium in esophagus)?

- In barium swallow: there is dye in esophagus and may be in antrum or body of stomach bit never fills the fundus.
- In barium meal; Trendlenberg's position: the fundus will contain barium

© هل ممكن يبقى فيه hiatus hernia بس من غير كعبورة فوق الـ diaphragm؟

ايوا ممكن بس دى مش علينا

Normally there is 5 cm of esophagus below the diaphragm (this is the most imp. factor to prevent regurge), if these 5 cm leave the abdomen to the chest it is considered a hiatus hernia and will cause regurge.

Sliding Hiatus Hernia

Paraesophageal Hiatus Hernia

Barium Enema

- We inject barium using a catheter introduced through the anal canal and then we do X-ray
- After that we do a double contrast test: we ask the patient to defecate barium and then we inject air (which is very painful), the air will cause the remaining barium to stick over the wall so we can see the mucosa.
- In barium enema there is mainly barium and some gases.
- In double contrast test there is mainly gases and few barium.

N.B. Always start reading barium enema from below upwards.

1- Carcinoma colon:

Annular stricture = Apple core

Irregular fixed filling defect

2- Diverticular disease:

Well-formed diverticulae → بتنزل

Saw teeth appearance → ما تنزلش

Filling Defect Apple Core

Carcinoma Colon

3- Ulcerative colitis:

Loss of haustrations .... Pipe stem appearance

و دى اخر حاجة تشخصها , بمعنى انك لو لقيت ulcerative كمل لغاية فوق عشان ممكن يبقى فيه حاجة تانية غيره و ساعتها هيبقى التشخيص التانى هو المطلوب

eg. Ulcerative colitis & carcinoma → Diagnosis is carcinoma

4- Polyposis coli:

Multiple filling defects is the only finding

5- Hirschsprung disease:

هتلاقى حتة ضيقة و حتة واسعة و ما بينهم funnel

اشعة طفل و هتلاقى الـ head of femur فيها خط اسود (epiphyseal line)

N.B. normally when you inject barium through the anal canal, funneling will occur, so don't diagnose this normal finding as Hirschprung disease.

6- Intussusception:

Usually child

Arrest of dye completely⟶ claw sign or coiled spring appearance

If the dye continue ⟶ not intussusception

Intussusception

Plain X-Ray

Stones:

- Stones in Lt hypochondrium ⟶ Kidney stones
- Stones in Rt hypochondrium ⟶ may be kidney or gall bladder stones

So we need lateral view to differentiate:

- Gall stones : in front of spine
- Kidney stones : resting over the spine

Gases:

1- Intestinal obstruction:

Supine: distended loops

Erect: multiple air fluid levels

N.B. in case of duodenal obstruction you will find double bubble sign

2- Invertogram:

- دا بيتعمل للأطفال اللى عندهم imperforate anus و بنعمله بهدف اننا نعرف هل دا high anomaly و لا low anomaly
- فبنقلب الطفل و نخلى راسه لتحت فالهوا اللى جوا الـ colon يطلع و يملا الـ rectum و ساعتها ناخد خط ما بين الـ pubis و الـ coccyx و نسمى الخط ده PC line
  - لو الـ rectum فوق الخط ← high anomaly
  - لو الـ rectum تحت الخط ← low anomaly

3- Pneumobilia:

Air in biliary tree:

I.V.U

Normally:

Pelvicalyceal system at T12, L1,2,3
& facing laterally
Urinary bladder: smooth, full, resting on symphysis pubis and may have smooth indentation on the upper surface (due to sigmoid colon or uterus)

1- **Double pelvis & Double ureter**

2- **Horse shoe kidney:**

At lower level & Pelvicalyceal system facing medially

3- **Ectopia vesica:**

Seperated symphysis زى كتاب مفتوح
In a child

4- **Ectopic kideny:**

Malformation: Pelvicalyceal system facing medially
Kidney at a lower level than normal
Ureter is NOT tortuous

5- **Ptosed kidney:**

الكلية نزلت من مكانها الطبيعى
Pelvicalyceal system facing laterally
Tortious ureter

6- **Bladder diverticulum:**

الـ dye برة لكن جوة الـ cyst

7- **Hydronephrosis:**

There will be marked ballooning of Pelvicalyceal system and you should locate the site of obstruction

8- **Bladder carcinoma:**

Filling defect

9- **Benign prostatic hyperplasia (BPH):**

It is always basal filling defect (never lateral)

- يعنى أى حاجة هتاكل الـ bladder من الـ lateral aspect تبقى على طول carcinoma حتى لو كانت smooth
- اما بقى لو كانت الـ bladder متاكلة من تحت فممكن تبقى BPH OR Carcinoma و عشان نفرق:

BPH: Smooth
Carcinoma: Irregular

10- **Polycystic kidney:**

الـ cysts شدت على الـ Pelvicalyceal system فعملت spider leg appearance

11- **Renal mass:**

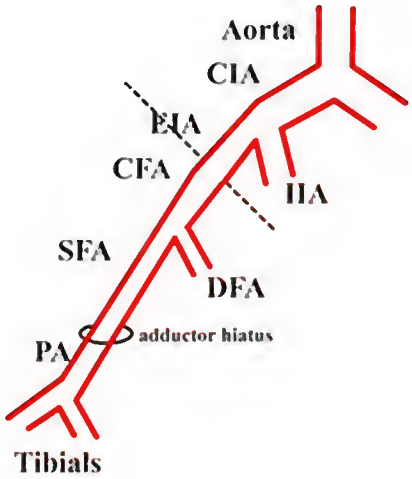
Displaced Pelvicalyceal system, distorted, amputated or spider leg appearance but on one side only

12- **Any injury:**

Extravasation of dye

Angiography

1st anatomy as a diagram →



Brief introduction about angiography:

We do angiography only in patients of ischemia going to be treated surgically (but if we are planning conservative treatment, there is no need for angio)

Types of angiography:

- **Direct Transfemoral angiography:** we inject dye in femoral artery and in such cases, one side only is viewed.
- In case of patients with left femoral artery closed and we need to visualize the arterial tree in left lower limb; **Transfemoral Aortography** is done, where we introduce the catheter through the right femoral aretery and move it till it reaches the aorta, then dye is injected so that it will pass from the aorta to both lower limbs (Both sides are viewed)
- In case of both femoral arteries occluded: **Direct Trans Lumbar Aortography** is done, where the dye is injected directly into the aorta by special needle introduced through the left side.
- In case of aortic block, a catheter is introduced through the brachial artery passing through the axillary the subclavian arteries, to reach the aorta where the dye is injected.

How to comment on any angiography?

- ✓ **Type of angiography:** From the side & the needle
  eg. If one side is viewed then it is direct transfemoral angiography
  If both sides are viewed and you find a needle that is introduced from the left side then it is direct translumbar aortography
- ✓ **Site of block:** The site of the stoppage of dye

N.B.

- ***Can the angio film be normal although we do it only in cases of ischemia?***
  Yes it can be normal as we take serial films for the patient to view the whole arterial tree in lower limb, so if the patient has the femeropopliteal block the films above this level will be normal!!

- ***The identification of level of block is usually easy except in case of block of superficial femoral or profunda femoris block***
  We differentiate by the shape of the artery:
  Superficial femoral: descends beside the femur in a direct way (with no branches) till its lower end where it approaches it
  Profunda femoris: has several branches and approaches the femur from its beginning

- ***Sometimes it is also difficult to differentiate between external iliac form internal iliac block,***
  To differentiate:
  External iliac artery: continues to lower limb
  Internal iliac artery: enters pelvis and doesn't continue to lower limbs
  - فلو شفت internal iliac باين يبقى دا external iliac block و العكس
- ***There may be internal iliac block and the patient is asymptomatic and it may be detected accidentally.***

Orthopedics

Fractures:

Identification is very easy; you will find a bone with a fracture

How to comment on any fracture?

1. **Site**
2. **Number**
3. **Trauma** (direct or indirect)
   Direct (شومة) you will find fracture at same level in both bones
   Indirect (falling from height) you will find fractures at different levels in both bones
4. **Recent or old:**
   You can know it by the presence of healing, callus or calcifications at site of fracture.
5. **Type of reduction**
6. **Age**

Bone Diseases:

You should comment on:

1. **Age** of patient
2. **Site** of lesion

1- **Ivory osteoma:** in skull ما بنتزلش فى الامتحان
   From osteoblasts

2- **Osteochondroma :**
   دمعتها على عينيها
   Commonest around knee joint
   Metaphysis of long bone
   May be multiple and precancerous
   Chondroblasts

3- **Osteoclastoma:**
   Epiphysis of long bone
   Soap bubble appearance
   Uncertain


Ivory Osteoma


Osteochondroma


Osteoclastoma

4- **Osteosarcoma:**
Metaphysis
Codman + Sunray appearance + Ghost =
عفريت كودمان لا يظهر فى الـ sunray
Osteoblasts

Osteosarcoma


Ewing s Sarcoma

5- **Ewing sarcoma:**
At diaphysis
Onion appearance (layers of new bone formation) + endothelial cells of bone marrow.

6- **Chondrosarcoma:**
From chondroblasts
Iliac bones & epiphysis of long bones
Fluffy cotton appearance

7- **Chronic osteomyelitis:**
Classic picture: abscess with cavity, inside the cavity there is sequestrum and outside the abscess it is surrounded by involucurum
But the classical picture is rare; usually you will see areas of bone destruction and areas of new bone formation

Chronic Osteomyelitis

8- **Fracture spine:**
Usually in the flexion position

9- **Congenital Bone Cyst:** ما بتنزلش فى الامتحان

Miscellaneuos

1- **Wedge fracture of the spine:**
- By myelography → myodin in the spinal canal

2- **Fissure fracture of the skull**
- فرق بين الكسر و بين الـ suture اللى بيكون مشرشر

3- **Gastric pull up:**
- Dye in chest = gastric pull up

4- **Hyperparathyroidism:**
- اى hand تبان فى الاشعة تبقى hyperparathyroidism

5- **Disc prolapse:** عادة ما ينزلش فى الامتحان
- MR spine
- فى صور الـ MR كأنك شايف anatomy

6- Myelography:

- لو مافيش interruption ← No disc prolapse
- لو فيه interruption ← Disc prolapse
- L4,5 & L5, S1 are famous sites of disc prolapse

7- CT brain:

- Extra Dural hematoma
- Brain trauma
- Fracture bone
- Hydrocephalus: dilated ventricular system
- Infarction

8- Thyroid scan:

- كورتين فوق = 2 lobes of the thyroid gland
- كورة تحت = بنحط علامة عند الـ supra sternal notch عشان نشوف الـ retro sternal extension

9- CT abdomen:

- Liver cyst: smooth wall
- Hepatoma: heterogeneous
- Splenic cyst
- Aortic aneurysm
- Pancreatic pseudo cyst
- Renal mass

10- Mammography:

- Mass and microcalcification carcinoma

11- Multiple osteolytic lesion in the skull:

- Malignant osteolytic lesion (metastasis) OR multiple myeloma

12- Depressed fracture: شكاوش

13- Double J catheter:

- Fixed catheter to prevent occlusion of ureter- after any intervention- by edema

قانون: any trace of dye in kidney = functioning kidney

قانون: IVU infusion assess function while dye through nephrostomy assess anatomy

قانون: Don't comment on radio opaque stone in IVU

14- Bone scan:

- النقطة الغامقة pathology لكن لو موجودة على الناحيتين تكون normal

15- MR bone tumors

16- Sialography :

- ابرة داخلة فى بق العيان